foundation until 1884, and was made an hon. member in 1902.

Prof. Senier took an active part in all matters connected with the government of Galway College and of the National University of Ireland. He was a member of the governing body of the college and a member of senate of the university, and possessed in a high degree the qualities that are essential for securing efficiency in a position of responsibility in the administrative work of a university. He was a fellow of the Chemical Societies of London and Berlin, a fellow of the Institute of Chemistry, a member of the Royal Irish Academy, and an honorary doctor of science of the late Royal University of Ireland.

NOTES.

THE French National Fête Day is July 14, but as the date fell on a Sunday this year it was celebrated with much enthusiasm in London on Friday and Saturday. Last year the sum of 200,000*l.* was raised on "France's Day" for the French Red Cross, and this year it is expected that a total of a quarter of a million pounds will have been reached. The festival was made particularly noteworthy by messages which were dispatched to France by many leading societies and institutions in Great Britain, among them being the following:—*Royal Society:* The Royal Society of London sends greetings to the French nation, and more especially to its scientific men. It recalls the intimate friendship which since their foundation has bound together the Académie des Sciences with its own body. Always united in their endeavour to promote the advance of science, they are now joined in their efforts to defend the cause of civilisation and freedom. *British Association:* Nineteen years ago the Dover meeting of the British Association was "so arranged that two great nations which had been, a century earlier, grappling in a fierce struggle should in the persons of their men of science draw as near together as they could." Another joint meeting with France was on the point of taking place when our high hopes of lasting general peace were so cruelly destroyed. But out of the destruction has arisen a far closer union of our two peoples, and an even brighter prospect of our future co-operation for the good of humanity and of science. *Royal College of Surgeons of England:* Brothers-in-arms, we greet you. Bound by ancient ties of blood and by the memories of many a gallant contest in the past, to-day we stand as one nation united in a sacred cause. We have before us a happy presage from the past. As the united efforts of Pasteur and Lister have laid low the tyranny of disease, so shall France and Britain conquer a tyranny still more remorseless. Our future brightens, and shall endow Gaul and Briton with a common birthright to remain a splendid heritage for all time. *British Academy:* To France, who has so often inspired and led civilisation in Europe: to France, who upholds the banner of intellectual freedom and unfettered thought; to France, who for nearly four years has endured brutal outrage and the violation of all decencies of humanity and civilisation, the British Academy, in the name of British scholarship, sends on this great anniversary a renewed assurance of loyal fraternity and of unshaken determination to continue the conflict until liberty is secured and French soil delivered from the desecration of the invader.

THE prevailing epidemic of so-called influenza is widespread both in this country and on the Continent. The most striking symptoms are sudden onset with chills, headache, and pain in the neck, back, loins, and limbs, with general malaise. Fever is present, ranging from 102° to 104°, or even 105° F., but generally disappears almost suddenly on the third or fourth day of attack, and the individual rapidly convalesces. On the whole, the disease is quite mild and unattended with complications. It differs from the true influenza, which was so prevalent in 1889 and the early 'nineties, by being milder and of shorter duration, and by the rapid convalescence. The true influenza is caused by Pfeiffer's bacillus, a minute rod-shaped microbe abundant in the bronchial secretion. As regards the present disease, Capts. T. R. Little, C. J. Garofalo, and P. A. Williams state that they have investigated a number of cases and entirely failed to find the *Bacillus influenzae*, but a gram-positive diplococcus appears to be constantly present in the naso-pharynx, throat, and sputum, which they tentatively regard as being the causative organism (*Lancet*, July 13, 1918, p. 34). The *Lancet* suggests that the disease would be better named "catarrhal fever."

THE following grants of money for research committees were voted by the General Committee of the British Association at the meeting in London on July 5:—*Section A.—Mathematical and Physical Science:* Seismological investigations, 100*l.*; discussion of geophysical subjects, 10*l.* *B.—Chemistry:* Colloid chemistry and its industrial applications, 5*l.*; non-aromatic diazonium salts, 7*l.* 7*s.* 8*d.* *D.—Zoology:* Inheritance in silkworms, 17*l.* *F.—Economic Science and Statistics:* Women in industry, 10*l.*; effects of the war on credit, etc., 10*l.* *H.—Anthropology:* Palæolithic site in Jersey, 5*l.*; archæological investigations in Malta, 10*l.*; distribution of Bronze-age implements, 1*l.*; age of stone circles, 15*l.*; anthropological photographs, 1*l.* *I.—Physiology:* The ductless glands, 9*l.* *K.—Botany:* Heredity, 15*l.*; Australian Cycadaceæ, 7*l.* 17*s.*; Australian fossil plants, 15*l.* *L.—Educational Science:* The "free-place" system, 5*l.* *Corresponding Societies Committee:* For preparation of report, 25*l.* Total, 268*l.* 4*s.* 8*d.*

THE death of Mr. Isaac Beardmore is recorded in the *Engineer* for July 12. Mr. Beardmore, who was eighty-two years of age, was joint proprietor, and was associated with the management, of Parkhead Forge, Glasgow, for about twenty years. Under his control the Parkhead Forge was converted from an iron to a steel works in 1878–80.

THE death is announced, on July 14, at seventy-seven years of age, of Dr. R. O. Cunningham, emeritus professor of natural history and geology, Queen's College, Belfast. Dr. Cunningham was naturalist to the survey of the Straits of Magellan and author of "Notes on the Natural History of the Straits of Magellan" and "On Reptiles, Amphibia, Fishes, Mollusca, and Crustacea obtained during the Voyage of H.M.S. *Nassau.*"

TWO Chadwick public lectures were delivered by Prof. D'Arcy Thompson last month at the Mansion House, London, and the Surveyors' Institution, Westminster, respectively. Abstracts of these lectures have been published in the *Fish Trades Gazette* of June 29 and July 6. The first dealt, in general, with the fishing industry of Europe, and in particular with the line and trawl fisheries of Great Britain. The second had for subjects the great herring fishery of the Scottish and English east coasts, the growth of the industry and its administration, and the origin of the fishing population.

A septuagenarian engineer of distinction, with a long record of useful public and private service, has passed away in the person of Mr. George Waller Willcocks, C.B., whose death occurred on July 7. His most prominent work in this country was in connection with the Local Government Board, which appointed him its chief engineering inspector in 1902. Some time previously he had been, first chief assistant, and then chief, hydraulic engineer for Ireland, until the office was abolished in 1890, when he received the thanks of the Irish Executive for his services. Mr. Willcocks had also considerable foreign and colonial experience. After several years with the East London Railway, he went out, in 1869, to Hungary, to engage in railway development in that country, and, in 1880, he was in South Africa, constructing waterworks in Natal and Cape Colony. His private practice included much Parliamentary work on railway Bills, and he also reported to the Thames Conservancy on the condition of the river from Purfleet to the sea. He was a member of the Institution of Civil Engineers, having been elected in 1873.

The Electrical Research Committee, which was appointed last autumn, under the auspices of the Department of Scientific and Industrial Research, is at present engaged in superintending a research on insulating materials (fibrous materials, porcelain, ebonite, mica, composite materials) and the waterproofing treatment of insulating windings of electrical machines, in respect of which grants have been made to the Committee by the Research Department, the British Electrical and Allied Manufacturers' Association, and the Institution of Electrical Engineers. The Committee consists of three members nominated by the institution, and three members nominated by the B.E.A.M.A., the nominees of the former being Mr. C. H. Wordingham (chairman of the Committee), Mr. C. C. Paterson, and Mr. C. P. Sparks, and those of the latter Mr. F. R. Davenport, Mr. D. N. Dunlop, and Mr. A. R. Everest. The temporary address of the Committee is 1 Albemarle Street, London, W.1, and the secretary is Mr. P. F. Rowell.

June this year was generally cold and dry over the United Kingdom, and for the first month of summer was far from seasonable. At Greenwich the mean temperature for the four weeks ending June 29, as shown by the weekly weather reports of the Meteorological Office, was 57·3° F., which is 2° below the normal. The greatest deficiency of temperature occurred in the closing week, when the mean was 56·7° and 4° below the normal. The maximum shade temperature in each of the last two weeks, ending June 22 and 29, was 73°, and for the week ending June 15 was only 74°. For one-half of the days in June the London temperatures failed to touch 70°. It is, however, not necessary to go further back than two years for an equally unsatisfactory record, the weather being decidedly colder in June, 1916, when the mean temperature for the month at Greenwich was 2° lower, and there was a greater absence of warm days. The month this year was drier. The total rainfall for the four weeks ending June 29 at Greenwich was 0·75 in., which is 1·06 in. below the normal, and 41 per cent. of the average. There was no rain in the week ending June 8, and only 0·06 in. for the week ending June 29. In the Midland counties the total rainfall for the four weeks ending June 29 was 0·91 in., and in the south-east of England 1·01 in. The report for the week ending June 29 states that the deficiency of rainfall in the South of England has been almost continuous since the week ending May 11, the deficiency for that period being 38 mm. or 1·50 in., and the total measurement in seven weeks is only 51 per cent. of the average.

We have received from Miss M. M. Brinkworth, 3 Mount Beacon, Bath, an example of a peloriate Viola flower. Pelorisation with or without spurs has been observed in various species of this genus, but the case illustrated by Miss Brinkworth's specimen differs in showing a concomitant increase in the number of sepals and petals.

Some interesting explorations were made in Spitsbergen last year by M. Adolf Hoel and Capt. S. Rövig, of the Norwegian Navy. A short paper in *La Géographie* (vol. xxxii., No. 2, 1918) gives the chief results. The territory examined was in the south, chiefly between Bell Sound and Horn Sound. M Hoel denies the distinction generally made between the Archean and Hecla Hook formations on the west coast. He claims to have discovered in the Hecla Hook beds north of Horn Sound rocks characteristic of the so-called Archean formation of Spitsbergen. All these rocks, at least in the south of Spitsbergen, he attributes to pre-Devonian, probably Silurian, times. M. Hoel further claims to have discovered Tertiary rocks on the west coast between Horn Sound and South Cape. The paper also contains some information about the Horn Sound glaciers. Finally, there is news of increased mining activity, including new claims and the encroachment of certain Scandinavian claims on British estates.

A report (vol. ii., A.5) on the Danish Oceanographical Expeditions of 1908–10 to the Mediterranean and adjacent seas deals with the distribution and life-histories of the fishes belonging to the families Argentinidæ, Microstomidæ, Opisthoproctidæ, and Mediterranean Odontostomidæ. The report, written by Dr. Joh. Schmidt, refers almost entirely to the collections made by the author himself on board the Danish Fishery Research steamer *Thor* during the years 1903–10 in the north-eastern Atlantic, and later on in the Mediterranean. It is entirely systematic. There are very clear charts showing the distribution of the fishes collected, and special attention is devoted to larval and post-larval forms, a large number of these being described and figured.

Bulletin No. 11 of the Department of Fisheries for the Province of Bengal and Bihar and Orissa (Calcutta: Bengal Secretariat, 1918) consists of an account of investigations on the Hilsa undertaken during 1917, and also of a summary of previous work. The Hilsa is a very highly esteemed Indian food-fish. It is a Clupeoid (*Clupea* or *Hilsa ilisha*), and, like the salmon, it is an anadromous fish ascending rivers from the sea in order to spawn. From the time of Francis Day (1873) it has been the subject of more or less unsuccessful investigation. Day, recognising that the existence of weirs or anicuts presented great difficulties to the upward passage of the fish, advised a kind of under-water fish-pass, which does not seem to have been successful The Madras Fisheries Department instituted research into methods of artificial culture in 1909, but this was apparently dropped. The present (Bengal) Department began again about the same time, and, after sending a superintendent to America to study methods of shad-culture, tried to propagate Hilsa on the same lines, but without success. In this paper Messrs. T. Southwell and B. Prashav examine the methods, discuss the reasons for failure, and suggest further investigation.

The May issue of the *Veterinary Review* (vol. ii., No. 2) contains, in addition to the reviews and abstracts of veterinary literature, a useful article by

Prof. Railliet on oxyurosis in the horse. After giving an account of the history and characters of the genus Oxyuris, the author describes the cosmopolitan species, *O. equi* (*curvula*). He holds that there is no warrant for referring to different species, as Jerke has done, the short-tailed and long-tailed females, for these gradually merge, and they agree in all other essential characters, and the males are identical. In Prof. Railliet's opinion the correct view is that *O. equi* has polymorphic females. A summary of the pathogenic effects of these worms is given, and observations on the life-history cited, which indicate that the species has a direct development.

DR. J. SCHWETZ contributes to the *Annals of Tropical Medicine and Parasitology* (vol. xi., No. 4) observations on the habits of three species of tsetse-flies—*Glossina brevipalpis, fusca,* and *pallidipes*—in the Belgian Congo. These three and two other important species—*palpalis* and *morsitans*—select as resting-places the trunks and larger branches of trees. In regions where they exist *brevipalpis* and *pallidipes* are not restricted to limited belts, but, like *morsitans*, are found uninterruptedly over large stretches of country. *Brevipalpis* accommodates itself to forest, park land, and wooded savannah, but *pallidipes* (like *morsitans*) does not inhabit the forest, whereas *fusca* occurs only in the forest, and, in fact, only in moderately dense forest belts. Where it does occur *fusca* is not uncommon and is sometimes even abundant; Dr. Schwetz states that his two trained native boys collected more than 500 specimens in a few weeks. This species does not fly during the day, like *morsitans* and *palpalis,* but remains motionless on tree trunks, being only occasionally stimulated into flight by the passing of men and animals. Its definite period of activity is an hour or two after sunset, and anyone passing then through a haunt of this fly is sure to be attacked by numerous specimens. The haunts of *brevipalpis, pallidipes*, and *fusca* are almost exclusively along roads and paths.

WE have received a pamphlet on the Rockefeller Foundation compiled by its president, Mr. George E. Vincent, being a review of its war-work, public health activities, and projects for medical education in 1917. The war-work includes a military base hospital of seventy beds erected in the grounds of the Rockefeller Institute in New York City, which embodies features which French and British practice has proved essential in a base hospital; here military and naval medical officers are sent for study and experience. A tuberculosis campaign has been instituted in France. The training of sanitary medical officers is being promoted by the foundation and maintenance of a school of hygiene at the Johns Hopkins University. Public health work is being carried out in many lands. The control of hookworm disease (anchylostomiasis) is being studied in several States of the Union, in Brazil, Siam, Fiji, and China. Malaria is being dealt with in some of the southern States, yellow fever in South America, medical education is being aided in China, and contributions of funds and material have been given to the American Red Cross. Truly a fine record, which has been rendered possible mainly by the princely donations of the founder, Mr. John D. Rockefeller.

THE phenomena of concretionary growth receive discussion in two recent memoirs of the Canadian Geological Survey. In Memoir 101 Mr. W. A. Johnston refers to the importance of elevation above the local water-table in promoting the formation of concretions in certain marine Pleistocene clays. In Memoir 102 Mr. T. T. Quirke discusses clay-balls in fluvioglacial clays in the Espanola district of Ontario, giving useful references to the analogous "marlekor" or Imatra stones of Fennoscandia.

WHEN Dr. L. L. Fermor showed, in 1906, that a crystalline form of psilomelane existed in Central India, he was without evidence of the system to which it should be referred. He now (Records Geol. Survey of India, vol. xlviii., p. 103, 1917) shows from a careful investigation that hollandite crystallises in the scheelite class of the tetragonal system, a bipyramidal class without vertical planes of symmetry, here styled "pyramidal" without further qualification. Dr. Fermor regards romanèchite, which was named but not described by Lacroix in 1900, as a hollandite with more water and less ferric oxide. Since the accents vary in the paper, it may be remarked that the grave accent is correct, as in the village name of Romanèche.

MR. P. W. BRIDGMAN (*Amer. Journ. Science,* vol. xlv., p. 243, 1918) has prepared a number of cylinders of rocks and crystals with central cavities drilled in them. These have been subjected in a jacketing cylinder of chrome-nickel steel to pressures up to 12,000 kg./cm.^{2}. Disintegration takes place from the walls of the cavity, and it gradually becomes filled with flakes and sand. In the case of crystals, the splinters have no obvious connection with the crystalline symmetry. Even the flaws in the original specimens appear to play no part in this secondary fracturing; they are probably already closed tightly by natural pressure. The author concludes that "minute crevices, at least large enough for the percolation of liquids, exist in the stronger rocks at depths corresponding to 6000 or 7000 kg./cm.^{2}, and possibly more."

A CONTRIBUTION to the question of the origin of kaolin in deeply seated rock-masses is made by Messrs. S. Paige and George Steiger of the U.S. Geological Survey (Journ. Washington Acad. Sci., vol. viii., p. 234, 1918). In connection with the chalcosine deposits of Tyrone, New Mexico, even quartz has become replaced by kaolin. It is suggested that sericite, which occurs abundantly as an alteration-product of felspar in the local porphyries, has become decomposed by solutions containing sulphuric acid from the copper ores. Fluorine, which is shown to exist in the sericite, is thus set free, and this has enabled the quartz to disappear in solution. Kaolin, resulting from the attack made upon the sericite, takes the place of the quartz in the final mass. The effect of descending solutions from sulphide ores in promoting the kaolinisation of sericite is also referred to by Mr. J. Coggin Brown in his recent description of the mines of galena and zinc-blende at Bawdwin in the North Shan States (Records Geol. Survey of India, vol. xlviii., p. 171).

THE French are turning their attention just now to the Pyrenean region, where considerable water-power is available for industrial purposes. A number of chemical factories have been, or will be, installed in the region. Of special importance (according to an article in *La Nature* for June 29) is the manufacture of calcium carbide, artificial fertilisers, and cyanates, while it is also hoped to develop the mineral deposits and treat them cheaply in the large factories, which will give ample power for the purpose. The bauxite deposits will be exploited for the production of aluminium, and the artificial fertiliser industry is sure to receive an impetus when the water-power still available is harnessed. At present only about one-fifth of that which can be produced is utilised. The article gives brief particulars of a number of installations which are already working, and of others which it is hoped to erect when capital and labour are available for the purpose.

THE amplitude of the oscillations produced in a singing arc depends on the curvature of the current-voltage characteristic curve. If i_0 is the constant current upon which the variable current of effective value i_1 is superposed, it is shown (*Revue générale de l'Electricité*, April 20) that $i_1=k\rho i_0/r$, in which k is a coefficient, ρ the curvature of the characteristic curve at the region over which the oscillations are taking place, and r the resistance of the oscillatory circuit. In this equation i_0 depends on i_1, and also on ρ and r, but if i_1 is not very large, i_0 may be considered as nearly equal to the current that would be obtained with $i_1=0$, and the equation would give to a first approximation the effective value of the oscillating current in the singing arc.

IN a lecture at the Technical College, Munich, Dr. A. Traube read a paper on the production of coloured photographs by a process which he calls "Uvachromie." Three photographs are taken through suitable colour-filters, the negatives being copied on ordinary kinematograph films. After fixing, these films are treated in a bath so as to form a chemical compound that readily absorbs colour material. The three component pictures can be coloured and dried in about twenty minutes, and they are then placed in register upon one another, and the coloured photograph is complete. The new process has the advantage that as many copies may be made as are required, the process being rapid and simple. The photograph retains its sharpness of definition, and corrections in colour can easily be made by replacing one or other of the component films in the colour solution for the appropriate length of time.

THE May (1918) issue of *Navigazione interna* (Propaganda dell' Associazione Nazionale del Congressi di Navigazione) gives particulars of the work of the Hydrographic Office of the Po during the period 1914–17. In spite of the war, much useful work has been done by the institution with regard to rainfall observation (the number of observation stations both in the mountains and plains has been increased and new methods of observation have been initiated), hydrography, levelling surveys, measurement of flow of streams, forecasting of floods and dry periods, the measurement of the turbidity of streams, temperature measurements on the waters of the Po, investigation of subterranean streams, etc. Rainfall observation and investigation, in particular, have received a great deal of attention. It is proposed to study Swiss methods of rainfall and snowfall observation, using various modern types of recording instrument, and to correlate and co-ordinate results. Glacier study has also had the attention of the authorities, and results of considerable importance as to the formation of glaciers and their influence on rainfall and temperature in valley regions should be anticipated when this work has been placed on its final basis.

ATTENTION may be directed to a Bulletin just issued by the Engineering Experiment Station of the University of Illinois, entitled "Percentage of Extraction of Bituminous Coal, with Special Reference to Illinois Conditions." It is well known that in coal-mining it is never possible practically to extract the whole of the coal from any given seam, and that a certain percentage is always left behind and lost; furthermore, such loss is admittedly greater on the average in the United States than it is in Great Britain, one of the main reasons being the low price of coal in the United States; "the coal-mining engineer of America accordingly has not had as his problem the development of methods of extraction which would result in the largest percentage of ultimate recovery, but rather the development of methods which would result in the lowest cost of production." From a table given in the present Bulletin it appears that the percentage of recovery of the entire seam ranges from as much as 97 per cent. in the George's Creek Field of Maryland to as low as 50 per cent. in Central Illinois. The subject necessarily requires discussion in detail, since the amount of coal left behind depends in each case upon a large number of conditions, the nature of the seam, its thickness, depth from surface, inclination, character of roof and floor all having to be taken into account, whilst the amount of damage done to the surface and the monetary value of such damage have also to be considered. Although American conditions of coal-mining are very different from those prevailing in this country, the Bulletin will well repay perusal by British coal-miners, especially if it arouses sufficient interest to cause a similar investigation to be undertaken in this country.

ACCORDING to a note in the *Chemical Trade Journal* for June 29, a new radio-active element of considerable emissive power has been detected in the residue from pitchblende, which forms the raw material employed as a source of radium. This residue was subjected to treatment which finally left undissolved only the members of the tantalum group; and this insoluble remainder showed a radiation, at first slight, but gradually increasing largely, which proceeded mainly from the evolution of actinium, and indicated the presence of the new element "protactinium." Experiments for the separation of the element are to be undertaken. The period of semi-disintegration probably fluctuates between 1200 and 18,000 years. The information is based on statements published in the *Münchner Neueste Nachrichten*.

OUR ASTRONOMICAL COLUMN.

DISCOVERY OF WOLF'S PERIODIC COMET.—M. Jonckheere, who has been searching for the return of Wolf's periodic comet since May 4, discovered it on July 9 at 10h. 45m. G.M.T. with the 28-in. equatorial at Greenwich. The comet was at the time of discovery between the 15th and 16th magnitude, and about 9″ in diameter. It is about +50s. in R.A. and 15′ north of the place given by M. Kamensky's orbit (A.J. 729). On July 10 the magnitude was estimated as 15th, and on July 12 as 14th. The comet was discovered in 1884, when it was of 8th magnitude, and was observed in the returns of 1891, 1898, and 1911, but not in 1905.

THE NEW STAR IN AQUILA.—The new star has varied but little in brightness during the past week, and was of approximately the 4th magnitude on July 14. The spectrum, however, has shown a further approach to the nebular stage. On July 13 Prof. Fowler observed that in the visible spectrum the enhanced lines of iron were represented only by very feeble lines at 517 and 532, while the line about 501, which would appear to be the chief nebular line, was scarcely inferior in brightness to H_β. The line about H_γ also appeared to have gained in relative brightness, as if the nebular line 4363 had made its appearance. The band at 464 was bright and broad, and a faint band on its less refrangible side was probably 4686. There was also a faint band about the position of the helium line 4471. The group of three bright lines in the region of D was reduced in intensity. It would seem that the loss in magnitude due to the fading out of the enhanced lines and the reduced